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The Documents Published in *The Electronic Library*: A Scientometric Overview

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Abstract

The present article is a bibliometric analysis of 2340 documents published in The Electronic Library retrieved from Scopus during 1983 to 2020. However, the primary focus has been on the prominent authors, thematic map and multiple collaboration ratio. The average citation for these documents is 4.74 citations per paper. Articles and review papers have been the important ingredients of the source journal. Overall 9787 citations were calculated for 2340 documents. The collaborative index is calculated as 1.99%. USA, United Kingdom and South Korea have been the leading countries in case of country-wise output. USA is equally ahead in terms of total citation received. The multiple country ratio is high (0.2381) for Spain. By and large, the fifteen highly cited papers constituted 11.54 percent citations in total citation received for the source journal.

Keyword: Bibliometrics; The Electronic Library; LIS journal; Authors' Collaboration; Prominent Authors; Thematic Map; MCP Ratio

1. Introduction

Journals are the primary source of information keeping academicians and researchers of the world abreast with latest upheavals in their respective subjects. It may be accessed as a print document, e-journal or may be retrieved by the users via some online databases. The databases often are in the form of collection of journals, though they can represent different source materials too. The mapping of research through bibliometric technique using the journal or a group of journals is a prevalent trend in library and information science (Cheng et al., 2019; Fuad et al., 2020; Kherde, 2020; Muthukrishnan, 2020). The present paper aims to map the research in *The Electronic Library (TEL)* on basis of selective bibliometric parameters.

TEL publishes research concerning digital research. The official website (Emerald Insight, n.d.) of the TEL clearly indicates the articles to be published will be on personal digital archiving, digital life, the cultural record, scholarly communication, social media interaction analysis, health communication, geographical information, big data, security and governance, language and lexicons and classification and coding. The journal is ranked by Clarivatics Analytics, Journal Citation Report/SSCI, Scopus, The Publication Forum (Finland) Australian Council of Professors and Heads of Information Systems (ACPHIS), BIF (Denmark) and Core Rankings.

2. Review of Literature

There are numbers of studies on bibliometrics; but the studies relating to journal or group of journals have been considered in the review of literature.

Davarpanah, M. R. & Asleki's (2008) study was based on the top 56 journals in Social Science Citation Index (SSCI). The Subject field analysis exposed maximum (29.87%) articles were seen on Communication and Information Technology as per LISA broad subject heading. Among the five groups of contributing countries, the pioneering group consisting of USA and UK were ahead with second group consisting of Canada, Australia and New Zealand was quick to follow the first one. The universities such as Missouri, Indiana, City University London, Pen Stat University, California, Loughborough, Pittsburgh and Harvard were the outstanding contributors. No great difference was seen in authorship pattern concerning single author or multiple authors, though single authors were to the front in contributions with 51.11%. Only 5% of the articles had higher immediacy index

Tsay, M. & Shu, Z. (2011) did the bibliometric analysis of Journal of Documentation (JoD). It was observed that the journal contained 354 research papers along with 14174 cited references during 1998 to 2008. About 1289 references were cited each year. The three main classes of cited journals in JoD were library science (64.1%), science (11.7%) and social science (7.1%). The study of cited document revealed that information storage and retrieval system, information science and information retrieval were highly cited subject areas.

Aharony, N. (2011) analyzed ten LIS journals to determine authorship pattern and main themes discussed in it. The authors showed tendency towards collaborative writing. Two authors (35.76%) co-authored most of the articles. The authors from North America (37.60%), Europe (36.96%) and Asia (20.72%) were the leading authors contributing to these LIS journals. According to Zin's (2007) classification information technology (17.99%), methodology (17.40%) and social information science (17.05%) have been identified as the focal themes.

Tella, A. & Olaboye, A. (2014) did the bibliometric analysis 218 papers of African Journal of Library, Archives and Information Science during 2000-2012. It was observed that single authors with 126 (57.8%) papers dominated the rest of authorship pattern. The authors contributing the source journals preferred to write on information retrieval (14.2%), followed by information technology (13.3%) and information services (11.9%). The page length of the articles ranged from 6 to 25. The theoretical papers constituted most (49.5%) of the research papers while empirical papers were at the second place with 34.4%.

Khan, I (2016) did the scientometric study to analyse research output of DESIDOC Journal of Library & Information Technology during 2010 to 2014. He revealed that mostly the Indian authors contributed to the source journal. B. M. Gupta was identified as the most prolific author with 16 contributions. Next to him were Chennupati K. Ramaiah (9) and Adarsh Bala (8). With regard to geographical contribution New Delhi, Maharashtra, Karnataka and Andhra Pradesh were the leading states. However, author opined that the journal needs to have foreign contributor in more numbers since the journal is international in its nature.

Bapte (2017) carried out a bibliometric analysis of the 4821 cited documents appended to the 295 articles published in *DJLIT* during 2011-15. The study revealed the dominance of single authorship with 1912 (39.65%) citations followed by two authors with 1152 (23.89%) citations, three authors with 456 (9.45%) citations and more than three authors with 386 (8%) citations. The degree of authors' collaboration was 0.51 and modified collaborative coefficient was 0.3661. Dr B.M. Gupta with 52 citations was identified as the most prolific author. Dr K.C. Garg and Dr B.S. Kademani were at the second and third position respectively. The study further exposed the journal to be the mostly cited information source 2560 (53.10%) followed by websites (22.69%) and books (10.81%). Ranked list of journals denoted *Scientometrics* to be the most used journal (6.60%) by the authors contributing in *DJLIT*. The source journal was at the second position in the ranked list with 5.43%.

Saberi, M. K.; Barkhan, S. H. R. (2019) R analysed 1397 papers in *Library Philosophy and Practice (LPP)* indexed in scopus. These papers were cited 2563 times and the most of the papers (195) were published in 2011. About 728 papers in LPP had received 1 or more citations. The paper written by W. Fang (2007) entitled 'Using google analytics for improving library website content and design: A case study' has been identified as the highly cited (65) article. Bharti R (19), Mohmood K (15) and Thanuskodi S were the most prolific authors contributing in LPP. The papers published in LPP were identified with five categories viz bibliometric studies, information seeking studies, library administration studies, information technology studies and open access studies. '*Library Philosophy and Practice*', '*The Electronic Library*' and '*Scientometrics*' were the most cited journals in the source journal.

3. Objective of the Study

The study has been carried out with following objectives.

1. To trace the growth of annual scientific production
2. To find out the most productive authors
3. To find out leading corresponding author's country
4. To find out total citations per country
5. To take an overview of highly cited papers.

4. Methodology

The data for the present study was retrieved from Scopus by using 'Advanced' search option. As the study aimed to do the bibliometric analyse of '*The Electronic Library*', the search option 'ISSN' given under 'Field Codes' and then 'Publication' was selected. Thus the final search query was designed as 'ISSN (0264-0473)' which produced the result with 2340 documents. This search was carried out on 24 August, 2019. The retrieved record were analysed using R-studio(Aria, M. & Cuccurullo, C. 2017). The co-authorship network is developed using bibexcel and Pajek. The references are arranged in APA style using Mendeley desktop.

5. Analysis and Interpretation of Data.

5.1 Annual Scientific Production

The scopus provides the availability of publication from 1983 the year which started with the publication of 21 documents. Nevertheless, annual growth can easily be seen if proceeded further. In the year 2002 and 2004, 123 and 115 documents have been produced respectively. The 2340 documents have been cited for 11094 times. The 871 articles published in 2007 were cited for maximum 871 times followed by 61 documents in 2010 have been cited for 804 times. The average citation per item is 4.74%. From 1998 onwards a citation rates seemed to be a high. All 2340 documents can be categorised as 1191 articles, 9 conference papers, 25 editorials, 1 letter, 82 notes, 992 review papers and 40 short surveys.

Table 1. Annual scientific production

Year	TP	TC	ACPP
1983	21	36	1.71
1984	29	22	0.76
1985	37	31	0.84
1986	51	16	0.31
1987	55	47	0.85
1988	52	46	0.88
1989	55	46	0.84
1990	67	51	0.76
1991	48	66	1.38
1992	53	88	1.66
1993	64	127	1.98
1994	55	85	1.55
1995	89	101	1.13
1996	73	170	2.33
1997	79	103	1.30
1998	51	115	2.25
1999	29	204	7.03
2000	33	367	11.12
2001	98	261	2.66
2002	123	457	3.72
2003	62	436	7.03
2004	115	409	3.56
2005	67	633	9.45
2006	64	710	11.09
2007	63	871	13.83
2008	66	724	10.97
2009	80	776	9.70
2010	61	804	13.18

2011	63	644	10.22
2012	50	508	10.16
2013	60	564	9.40
2014	52	318	6.12
2015	70	519	7.41
2016	60	264	4.40
2017	73	276	3.78
2018	74	139	1.88
2019	66	54	0.82
2020	32	6	0.19

5.2 Authors' Collaboration

In all, 2527 authors contributed the total research output; nevertheless they made 3890 appearances. The authors of single-authored documents are 732 while the authors of multi-authored documents are 1795. Yet again, there are 1437 single-authored documents. The document per author is 0.926. The author per document is 1.08. The co-authors per documents are 1.66. The collaboration is dominant features of any written scientific output as single person cannot have necessary skill, knowledge and resources to resolve research problem (Gupta, 2005). In the present research study, the collaborative index is registered as 1.99%.

5.3 Most Productive Authors

Table 2. Most productive authors

Author	TP	TC	h-index	g-index	m_index	PY Start
Falk, H	90	96	5	8	0.135	1984
Raitt, D	40	24	3	4	0.079	1983
Blake, M	38	6	2	2	0.063	1989
Fourie, I	19	62	4	7	0.182	1999
Calvert, P	15	4	1	2	0.053	2002
Surla, D	13	236	9	13	0.692	2008
Barkar, P	12	74	4	8	0.114	1986
Roberts, J	12	0	0	0	0	1988
Cawkell, A. E.	10	3	1	1	0.031	1989
Chen, H. L.	10	123	7	10	0.318	1999
Jeapes, B.	10	11	2	3	0.077	1995
Morris, A	10	44	4	6	0.125	1989
Kruger, P	9	1	1	1	0.037	1994
Mahmood, K	9	176	7	9	0.389	2003
Mutula, S. M.	9	218	6	9	0.316	2002
NA	65	277	3	6	0.079	1983

One of the important components of any bibliometric study is to find out the most prolific authors. The table no.2 gives the list of 15 most prolific authors in terms of quantity of papers

who contributed 13.07 percent research papers in complete research output. The authorship of 65 documents could not be determined. Falk, H (90), Raitt, D (40) and Blake M (38) have been observed as the leading contributors in *TEL*. Nevertheless Mehmood, K who is at the 15th position in respect of contribution is highly quoted authors as he has got 146 citations for his 8 papers. Naturally his average citation per paper is also equally high. With regard to H-index, Falk, H., Surla, D and Barkar, P have the h-index of 13 each.

Figure 1 shows the co-authorship network of the authors who came together to write jointly. Leggate, P. and Dyer, H. and Steverts, E. and Hofstede, M. both these pair produced 6 articles together. Further strong co-authorship is visible between Surla, D. and Milosavljević, B. who produced 5 documents jointly. The pair is followed by Gibb, F. and Landoni, M. contributing 4 articles collectively.

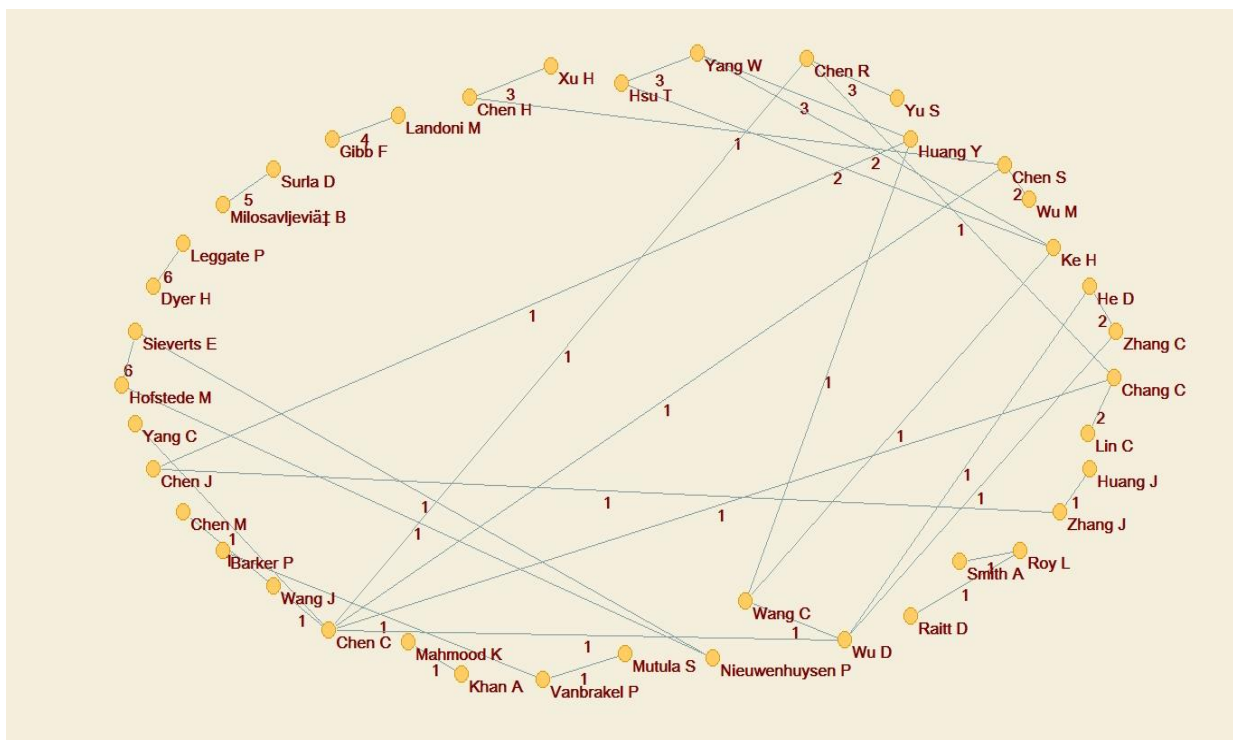


Fig.1 Co-authorship network

5.3 Thematic Map in *TEL*

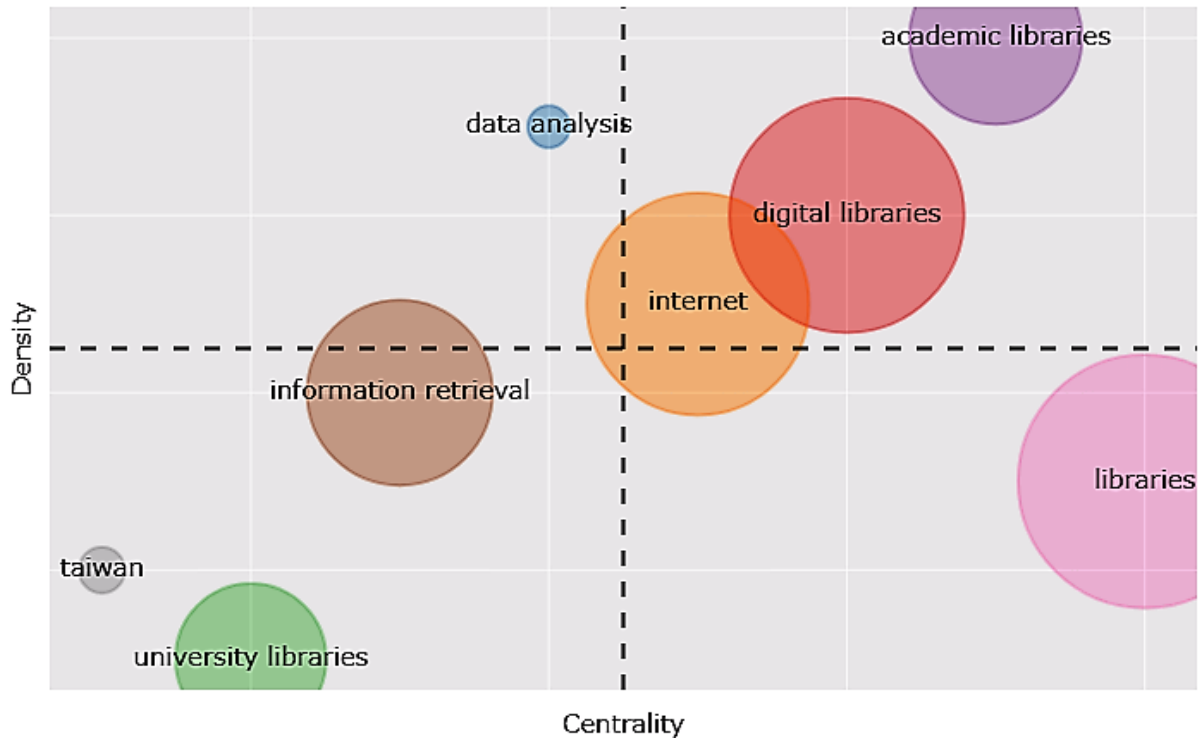


Figure 2. Thematic map in *TEL*

Figure 2. is indicative thematic quadrant of the articles published in EL bounded by two half-axes. The first quadrant indicates motor themes, the second quadrant shows highly developed themes, third quadrant symbolises emerging and declining themes and fourth quadrant contains basic and transversal themes. The importance of the themes in the research can be measured through centrality while density traces the evolvement of themes (Aria, M. & Cuccurullo, C. 2017).

The largest cluster consists of the label 'libraries' comprehending 10 subthemes occurring 491 times. The prominent themes in this cluster are libraries (145), world wide web (55), librarians (43), information management (37), electronic publishing (32) and library automation (25). 'Digital libraries' has been the second largest cluster which included 14 sub-themes wherein digital libraries (152), information services (46), china (33) user interfaces (27) have been the maximum occurrences. All the sub-themes registered 428 occurrences. The third largest cluster is denoted by the themes 'internet' which included 10 subthemes in it getting noted for 391 times. Internet (130), user studies (65), electronic books (37) have been the noteworthy sub-themes in this cluster. 'Information retrieval' reflects the 4th largest cluster which is embedded with 10 sub-themes in it. The prominent sub-themes have been information retrieval (77), database (39), electronic media (36), electronic journals (29) and search engines (22). The label 'academic libraries' represented the fifth cluster with 8 sub-themes in it. Academic libraries (115), social media (23), web 2.0 (22), e-books (15) and World Wide Web (15) were the centre point of study in this cluster. The sixth and seventh cluster are symbolised by 'Taiwan' and 'data analysis' each containing 7 sub-themes in itself. Higher education, e-learning, metadata, open access, digital storage, museums, archival

management, multimedia, semantics and mobile communication occupied larger coverage over here.

5.4 Country wise Production with MCP Ratio

Table 3. Country wise production with MCP ratio

Sr.No.	Country	Article	Frequency	SCP	MCP	MCP-Ratio
1.	USA	308	0.2297	292	16	0.0519
2.	United Kingdom	225	0.1678	213	12	0.533
3	South Africa	80	0.0597	78	2	0.0250
4	Taiwan	80	0.0597	75	5	0.0625
5	India	69	0.0515	67	2	0.0290
6	China	54	0.0403	45	9	0.1667
7	Iran	50	0.0373	46	4	0.0800
8	Australia	47	0.0350	45	2	0.0426
9	Nigeria	47	0.0350	47	0	0.0000
10	New Zealand	43	0.0321	42	1	0.0213
11	Netherlands	28	0.0209	27	1	0.0357
12	Spain	21	0.0157	16	5	0.2381
13	Korea	19	0.0142	19	0	0.0000
14	Canada	16	0.0119	15	1	0.0625
15	Bostswana	15	0.0112	13	2	0.1333

SCP=Single Country Publication; MCP=Multiple Country Publication

The contributions of different countries are often determined by the location of the affiliation of at least one author of the published document(Sun & Yuan, 2020). In the present study, out of the total research output, USA is the leading (308) contributor. It is ahead in single country publication and multiple country publication as well. United Kingdom is second in the list with 225 documents. It equally stands second pertaining to SCP and MCP. These countries are followed by South Africa, Taiwan, India, China, Iran, Australia, Nigeria and New Zealand. But all the countries are behind compared to USA and United Kingdom. The multiple country ratio is high (0.2381) for Spain.

5.5 Most Cited Country

Although China has secured third position in respect of publication output, yet it has got maximum average article citations (11.50%) and has higher MCP ratio than USA and United Kingdom. Botswana (25.43%), Serbia (18.83%), Malaysia (15.20%), Pakistan (14.14%) and India (13.80%) are significant in the context average article citations.

Table 4. Most Cited Country

Sr.No.	Country	Total Citations	Average Article Citation
1	China	1345	11.50%
2	USA	1271	4.57%
3	United Kingdom	1035	5.15%

4	India	883	13.80%
5	Iran	546	10.92%
6	South Africa	480	6.76%
7	Nigeria	443	9.63%
8	Botswana	356	25.43%
9	Australia	269	6.26%
10	Korea	234	10.17%
11	Serbia	226	18.83%
12	New Zealand	210	5.00%
13	Spain	206	10.84%
14	Pakistan	198	14.14%
15	Malaysia	152	15.20%

5.6 Highly Cited Papers

Table no 5 reflects 15 highly cited articles in the source journal. These fifteen highly cited papers constituted 11.54 percent citations in total citation share. The article written by Huang J H, Lin Y R and Chuang ST in 2007 was highly cited article which received 159 citations with 13.2500 citations per year. The article written by Chu H C et al was cited for 92 times with 8.3636 citations per year. The article contributed by Lim D and Klobas J in 2000 was the third highly cited (87) article. The remaining cited articles have been given in the table for reference. These entire articles have been published after 2000.

Table no.7- Highly Cited Paper

Sr.No.	Paper	Total Citations	TC per Year
1.	Huang J H, Lin Y R and Chuang ST, Elucidating user behavior of mobile learning: A perspective of the extended technology acceptance model, <i>Electronic Library</i> , 25(5) (2007) 585-598	159	13.2500
2.	Chu H C, Hwang G J, Huang S X and Wu T T, A knowledge engineering approach to developing e-libraries for mobile learning, <i>Electronic Library</i> , 26 (3) (2008) 303-317	92	8.3636
3.	Lim D and Klobas J, Knowledge management in small enterprises, <i>Electronic Library</i> , 18 (6) (2000) 420-432	87	4.5789
4.	Van Zyl AS, The impact of social networking 2.0 on organisations, <i>Electronic Library</i> , 27 (3) (2009) 906-918	85	8.5000
5.	Mutula S M and Van Brakel P, E-readiness of SMEs in the ICT sector	84	6.4615

	in bostwana with respect to information access, <i>Electronic Library</i> , 24(3) (2006) 402-417		
6.	Harinarayana N S and Raju N V, Web 2.0 features in University Library Websites , <i>Electronic Library</i> , 28(1) (2010) 69-88	80	8.8889
7.	Thomas P Y, Cloud computing potential paradigm for practising the scholarship of teaching and learning, <i>Electronic Library</i> , 29(2) (2011) 214-224	69	8.6250
8.	Gu F and Widen-Wulff G, Scholarly communication and possible changes in the context of social media: A finnish case study, <i>Electronic Library</i> , 29(6) (2011) 762-776	67	8.3750
9.	Bennett L and Landoni M, E-books in academic libraries, <i>Electronic Library</i> , 23(1) (2005) 9-16	62	4.4286
10.	Jeong, H, A comarariosn of the influence of electronic books and paper books on reading comprehension, eye fatigue and perception, <i>Electronic Library</i> , 30(3) (2012) 390-408	59	8.4286
11.	Sharifabadi S R, How digital libraries can support e-learning, <i>Electronic Library</i> , 24(3) (2006) 389-401	59	4.5385
12.	Yan J J and Choi H J, Security issues in online games, <i>Electronic Library</i> , 20(2) (2002) 125-133	59	3.4706
13.	Smed J, Kaukoranta T and Hakonen H, Aspect of networking in multiplayer computer games, <i>Electronic Library</i> , 20(2) (2002) 87-97	57	3.3529
14.	Nandez G and Borrego A, Use of social networks for academic purposes: A case study, <i>Electronic Library</i> , 31(6) (2013) 781-791	55	9.1667
15.	Jaykathan R, Application of computer games in the field of education, <i>Electronic Library</i> , 20(2) (2002) 98-102.	55	3.2353

6. Conclusion

The article is based on the bibliometric analysis of 2340 documents published in *The Electronic Library* retrieved from Scopus during 1983 to 2020. A continuous growth in publication output and citations received is observed. The top 15 authors at the apex contributed 13.07 percent research papers in the entire research output. Falk, h., Raitt, D. And Blake, M have been identified as the most outstanding authors. Sarla, D. (9), Chen, H. L. (7), Mehmood, K (7) have the highest h-index. USA and United Kingdom was spotted at the peak dominating with SCP while United Kingdom, Spain and China are countries having higher MCP ratio. The article written by Huang J H, Lin Y. R. and Chuang ST in 2007 was highly cited article which received 159 citations. The study is limited in that only LIS one journal has been considered for bibliometric analysis. If some group of journals from library and information science are selected for the study, it would be possible to find out some pattern and deduce some meaningful conclusion.

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